## (19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 6 May 2005 (06.05.2005)

PCT

(10) International Publication Number WO 2005/040890 A2

(51) International Patent Classification7:

G02B 17/08

(21) International Application Number:

PCT/EP2004/011587

(22) International Filing Date: 15 October 2004 (15.10.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/511,673

17 October 2003 (17.10.2003)

(71) Applicant (for all designated States except US): CARL ZEISS SMT AG [DE/DE]; Carl-Zeiss-Strasse 22, 73447 Oberkochen (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SHAFER, David [US/US]; 56 Drake Lane, Fairfield, CT 06430 (US). DODOC, Aurelian [RO/DE]; Hainbuchenweg 7, 73447 Oberkochen (DE). EPPLE, Alexander [DE/DE]; Langerstrasse 38, 73431 Aalen (DE). ULRICH, Wilhelm [DE/DE]; Lederackerring 44, 73434 Aalen (DE). SCHUS-TER, Karl-Heinz [DE/DE]; Rechbergstrasse 24, 89551 Koenigsbronn (DE).

(74) Agent: PAE RUFF, WILHELM, BEIER, DAUSTER & PARTNER; Kronenstrasse 30, 70174 Stuttgart (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CATADIOPTRIC PROJECTION OBJECTIVE

(57) Abstract: A catadioptric projection objective for projecting a pattern arranged in the object plane of the projection objective into the image plane of the projection objective, having: a first objective part for projecting an object field lying in the object plane into a first real intermediate image; a second objective part for generating a second real intermediate image with the radiation coming from the first objective part; a third objective part for generating a third real intermediate image with the radiation coming from the second objective part; and a fourth objective part for projecting the third real intermediate image into the image plane.



